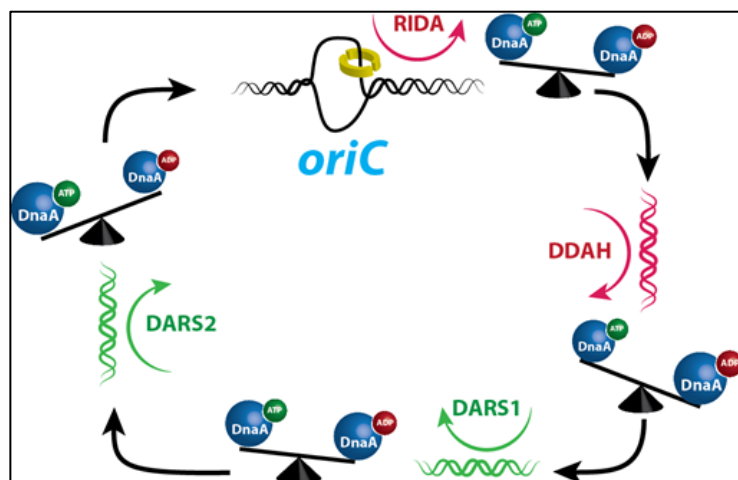


## CENTRE HIGHLIGHTS OF THE YEAR

In the second year of the Centre, activities were up and running at full throttle – both with respect to scientific meetings, recruitment of staff and the implementation of new projects. Overall, the year has been highly productive.

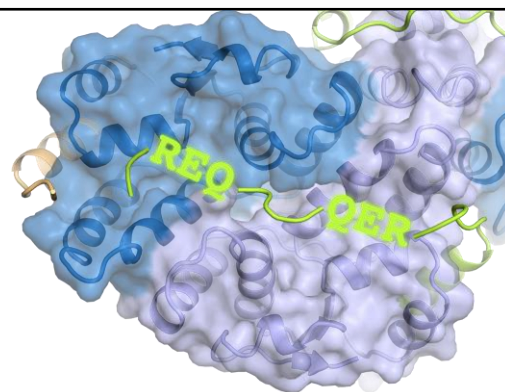
**ACTIVITIES** In May, the Centre hosted its first annual site visit from the Danish National Research Foundation, including a tour of the lab and talks by Centre Principal Investigators (PIs), Postdoctoral Research Assistants (PDRAs) and PhD-students. In August, the Centre held its annual retreat at Kysthusene in Gilleleje, with talks by PhD students, PDRAs and Centre PIs. Head-of-Centre **Kenn Gerdes (KG)** gave a Keynote Lecture at the International Plasmid Biology Conference, Cambridge, UK and a presentation at the Royal Society in London, UK. The other Centre PI's participated in a number of meetings and conferences throughout Europe, Asia and USA as invited speakers. **Sine Lo Svenningsen (SLS)** organized the “Merit, Metrics and Research Management & Gender Bias: A Symposium on Women in Science” held at the Faculty of Science, with 250 participants. **SLS** also participated in establishing the Danish RNA Society. The fall and winter were very busy with teaching at all levels. **KG** initiated a new, article-based course (15 ECTS).

**RESEARCH** The Centre PIs published 42 papers in 2016 on topics related to the Centre, 11 of which were Open Access. *BASP* published in high-ranking journals, such as *Nature*, *Science*, and *Molecular Cell*. Further, the Centre produced 39 conference proceedings. One of **KG**'s PDRAs received a Long Term Fellowship from EMBO, while another received a Marie Skłodowska-Curie Individual Fellowship. The Centre generated a number of breakthroughs, two of which are illustrated below.



**Figure 1. Chromosome Replication Cycle (ALO).**

Dynamic balance between ATP-bound (active) and ADP-bound DnaA (inactive). Immediately after initiation, RIDA and DDAH tip the balance towards DnaA-ADP, preventing additional replication rounds. At later cell cycle stages, duplication of the DARS1 and DARS2 regions accelerate the rejuvenation of DnaA-ADP to DnaA-ATP. When a critical threshold of the DnaA-ATP/DnaA-ADP ratio is reached, initiation of a new round of replication is triggered. Controlled evolution experiments revealed that the chromosomal locations of DARS-sites are important for function, consistent with their evolutionary conservation.



**Figure 2. Protein Palindromes (DEB).**

Several crystal structures of the VapBC toxin-antitoxin (TA) complex were solved. The structures revealed that the antitoxins recognize and neutralize their partner toxin molecules using a hitherto unknown palindromic "code" sequence illustrated above (REQ-QER). Moreover, structures of VapBC bound to DNA revealed the subtle changes that take place upon DNA binding, thereby explaining positive cooperativity at the molecular level for the first time.

**EDUCATION AND OUTREACH** The Centre produced a total of 8 master students and 20 bachelor students as well as participated in teaching in a long list of courses at the Faculty of Science and one online PhD course. The Centre continued to be present in the press (**KG** was interviewed by the New York Times and videnskab.dk; **DEB** was featured in Kristeligt Dagblad) and on the university websites.